EARLY MAN IN SCOTLAND.[1]

II.

ONE may now inquire into the reason why cinerary urns, with their contained ashes, and short cists, enclosing bodies which had been buried in a bent or stooping attitude, should be associated with the men of the Bronze Age. The first and most important is the presence of objects made of bronze. In the 144 localities under analysis in which interments ascribed to the Bronze Age have been examined, bronze articles were found in thirty-four directly associated with the interments. In four of these the bronze was along with objects made of gold. In seven other interments of the same character gold ornaments without bronze were present. The men of this period were, therefore, workers in gold also; and as it has been, and indeed still can be, mined in Scotland, it is not unlikely that the ornaments had been wrought from native metal. Additional proof that the burials in short cists, and after cremation in cinerary urns, both belonged to the same period, and were practised by the same people, is furnished by the presence of articles of bronze and gold in both groups of interment.

But, in addition to metallic objects, the graves sometimes contained other implements and ornaments. In many localities articles made of flint, stone, or bone, and jet beads were associated with bronze. In others flints in the form of chips, knives, arrow-heads, and spear-heads; stone implements in the form of whetstones and hammers; bone and jet ornaments and bone pins have been found in short cists, and some of these articles also in cremation interments, unaccompanied by bronze.

Attention has been called by Dr. Joseph Anderson to the character of the bronze objects usually associated with these burials ("Scotland in Pagan Times"). For the most part they have been thin blades, leaf-like or triangular in form, and either with or without a tang for the attachment of a handle. From their shape they might have been used as spear-heads, daggers, or knives. Not unfrequently the surfaces of the blade were ornamented with a punctated or incised pattern. Sometimes bronze pins, rings and bracelets have been obtained from these interments. It should, however, be stated that the bronze articles and ornaments of gold found in association with the burials are of a more simple character, and present less variety in form, purpose and decoration than those which have been got in hoards, in various parts of Scotland. It would seem, therefore, as if the people of this period, even if they were in possession of such finished and beautifully decorated swords, bucklers, axes and bronze vessels as have been got in the hoards just referred to, did not deposit them in the graves of their deceased friends and relatives. It may be, however, that the simpler articles found in the interments represent a period in the Bronze Age earlier than that in which the art of making the more elaborate articles had been acquired, when perhaps the custom of depositing grave goods had been more or less departed from.

Cinerary urns are not the only utensils formed of baked clay to which the term urn has been applied, and archæologists recognise by the names of "incense cups," "food vessels" and "drinking cups," three other varieties.

The examples of so-called Incense cups are not numerous in Scotland; they were associated with cremation interments, and have usually been contained in cinerary urns; they are the smallest of all the varieties of urn, and are, as a rule, from 2 to 3 inches high and about 3 inches wide. In one specimen from Genoch, Ayrshire, the cup possessed a movable lid. Not unfrequently the outer surface was patterned with horizontal, vertical, and zig-zag arrangements of lines. In a few cases the sides were perforated, as if to allow the escape of fumes; and it is probably from this character, as well as from their small size, which fitted them for being easily carried in the hand, that they have been termed incense cups. The burning of incense would, however, imply, on the part of the people of the Bronze Age, the possession of fragrant gums and resins such as are not indigenous to Britain, and which the ancient Caledonians were not at all likely to be in a position to procure. In most instances the contents of these cups were not preserved by the finders. An example which was discovered in 1857 at Craig Dhu, North Queensferry, covered by a larger urn, and about the size of a teacup, was filled with calcined human bones; the specimen from Genoch, found a number of years ago by Dr. James Macdonald, of Ayr, contained the burned bones and ashes of a child in its fifth or sixth year. Of the conflicting theories as to the purpose to which these cups were applied, the view that, like the large urns with which they were associated, they were cinerary, and were intended for the reception of the ashes of an infant or young child, seems the most probable.

Numerous examples of the variety of urn termed "food vessel" have been found in Scotland, and "drinking cups" although not quite so numerous, are fairly represented. In the 144 localities under analysis, the bowl-shaped food urns were found in thirty-one, drinking cups in twenty-five, and in seven instances the size and form of the urn is not stated with sufficient precision. With a few exceptions, in which the character of the burial had not been fully described, the urns were contained in short cists, in which also the skeleton of an unburnt body in the bent or contracted position was lying. In several instances it is stated that the urn, either food or drinking vessel, contained black dust, or earth, or greasy matter, but burnt bones are never said to constitute their contents. Not unfrequently, although this is not an invariable rule, the urn was placed in proximity to the head and raised hands of the skeleton.

These varieties of urn are by no means invariably present in short cists. In twenty-five localities where this kind of grave was seen, there is no record of either form of urn being present. It is obvious therefore that, though associated with so many inhumation interments, they were not regarded as necessary accompaniments, and they obviously discharged in the minds of the people of the time a different function from that of cinerary urns. The term food-urns applied to the bowl-shaped variety is probably appropriate, as indicating that edible substances were placed in them, in the belief that food should be provided for the use of the corpse. It is questionable, however, if the taller variety were drinking cups, as the unglazed clay would not fit them for the retention of liquids for any length of time. The presence of food urns in cists, along with, in some instances, implements and weapons, would point to the belief, in the minds of those practising this form of interment, in a resurrection of the body, and a restoration to the wants and habits of the previous life. It may be that placing the body in the crouching position, lying on one side, was regarded as the attitude best fitted, when the proper time came, to enable it to spring into the erect position and assume an active state of existence. The practice of cremation, however, to an almost equal extent as inhumation, by people of the same period, shows that they may not all have shared in the belief in a corporeal resurrection. But it should not be forgotten that, even in many cremation interments, blades and other objects made of bronze have been found along with the burnt bones and cinerary urns, as if for use in a future life.

The association of bronze objects, both with short cists and cinerary urns, establishes these forms of interment as practised at a time when bronze was the characteristic metal used in many purposes of life. The crouching attitude of the dead body, the contracted grave, and the varieties of urns already described, are therefore to be regarded as equally characteristic of this period, even if bronze is not found in a particular instance associated with the interment, and this view is generally held by archæologists in Scotland.

In a preceding paragraph implements and weapons made of stone, flint and bone were referred to as having been sometimes associated with bronze, and also of similar objects having been found in graves, in which, though obviously of the same class and period, no article made of metal was observed. Such an association proves that there was no sharp line of demarcation between the employment of the more simple substances used by Neolithic man in the manufacture of implements and weapons, and the use of bronze for similar purposes. The two periods undoubtedly overlapped. It has been customary to regard this overlapping as if bronze-using man had continued for a period to employ the same substances in making useful articles as did his Neolithic predecessors; that time was required before the more costly bronze, imported from foreign sources, replaced the native material, and that consequently both groups of objects became associated in the same grave.

Additional light is thrown on the mixture in the same interment of objects representing different stages of culture by a collection of goods from the grave of an aboriginal Australian, buried about fifty years ago, recently brought under my notice by Dr. R. Broom. Along with the skeleton were found a clay pipe, an iron spoon, the remains of a rusted pannikin, the handle of a pocket-knife, and a large piece of flint. The handle of the knife, with its steel back, had doubtless been used along with the flint for the purpose of obtaining fire, as in Neolithic times a similar office was discharged by flint and a nodule of pyrites. These accompaniments of the Australian interments show that men in a lower grade of culture and intellectual power utilise, as opportunity offers, objects representing a much higher civilisation. It is possible, therefore, that some of the mixed interments ascribed to the Bronze Age may be the graves of Neolithic men who, in conjunction with articles of their own manufacture, had employed the material introduced by a bronze-using race, with whom they had been brought in contact, and whose usages they had more or less imitated.

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[1] A discourse delivered at the Royal Institution, London, by Sir William Turner, F.R.S. (Continued from page 237.)

That the inhabitants of prehistoric Scotland were not a homogeneous people, but exhibited different types in their physical configuration, so as to justify the conclusion that they were not all of the same race, has long been accepted by archæologists. The first observer who made a definite statement, based on anatomical data, was the late Sir Daniel Wilson, in his well-known "Prehistoric Annals of Scotland." Whilst admitting that the material at his disposal was scanty, he thought that he was justified in stating that the primitive race in Scotland possessed an elongated dolichocephalic head, which he termed boat-shaped, or kumbecephalic. This race, he said, was succeeded by a people with shorter and wider skulls, which possessed brachycephalic proportions. Further, he considered that both these races preceded the intrusion of the Celtæ into Scotland. But the evidence is by no means satisfactory that the interments from which Wilson obtained the long kumbecephalic skulls were of an older date than those which yielded the brachycephalic specimens. So far, therefore, as rests upon these data, one cannot consider it as proved that a long-headed race preceded a broad-headed race in Scotland, and that both were antecedent to the Celtæ.

Evidence from other quarters must be looked for, especially from the extensive researches of Thurnam, Greenwell, Rolleston and other archæologists into prehistoric interments in England; and by the study of the material which has accumulated in Scotland since the publication of Sir Daniel Wilson's "Prehistoric Annals."

The remains of prehistoric man in England subsequent to the Palæolithic Age have for the most part been found in mounds and tumuli, some of which were very elongated in form, others more rounded, so that they have been divided into the two groups of Long and Round barrows. There is a consensus of opinion that the long barrows were constructed by a race which inhabited England prior to the construction of the round barrows. The long barrows are indeed the most ancient sepulchral monuments in South Britain; obviously they were erected before the use of bronze or other metal became known to the people. They belonged, therefore, to the Neolithic Age, as is testified by the implements and weapons found in them being formed of stone, flint, bone and horn, and by the absence of metals. They are not widely distributed in England, but are found especially in a few counties in the north, as Yorkshire and Westmorland, and in the western counties in the south. The builders of these barrows in their interments practised both inhumation and cremation, but the burnt bones were never found in urns.

The study of the human remains obtained from the English long barrows by Drs. Thurnam and Rolleston proves that the crania were distinctly dolichocephalic, and that the height was greater than the breadth. Those measured by Dr. Thurnam gave a mean length-breadth index 71 4, whilst Dr. Rolleston's series were 72·6.

The round barrows were constructed by a bronze-using people. The crania obtained in them were, as a rule, brachycephalic. Of twenty-five skulls measured by Dr. Thurnam seventeen had the length-breadth index 80 and upwards, and in six of these the index was 85 and upwards. Only four were dolichocephalic, whilst in three the index ranged from 77 to 79. In the brachycephalic skulls the height was less than the breadth.

As similar physical conditions prevailed both in England and Scotland during the Polished Stone and Bronze periods, there is a strong presumption that the two races had, in succession to each other, migrated from South to North Britain. Unfortunately very few skulls have been preserved which can with certainty be ascribed to Neolithic man in Scotland, but those that have been examined from Papa Westray, the cairn of Get and Oban, are dolichocephalic, and doubtless of the same race as the builders of the English long barrows.

Seventeen skulls from interments belonging to the Bronze period have been examined by the author. The mean length-breadth index of twelve was 81·4, and the highest index was 88·6. In each skull the height was less than the breadth. In the other five specimens the mean index was 74; the majority, therefore, were brachycephalic. In only one specimen was the jaw prognathic; the nose was almost always long and narrow: the upper border of the orbit was, as a rule, thickened, and the height of the orbit was materially less than the width. The capacity of the cranium in three men ranged from 1380 to 1555 c.c.; the mean being 1462 c.c. In stature the Bronze men were somewhat taller than Neolithic men. The thigh bones of the Bronze Age skeletons gave a mean platymeric index 75·1, materially below the average of 81 8 obtained by Dr. Hepburn from measurements of the femora of modern Scots.[1] The tibiæ of the same skeletons gave a mean platyknemic index 68·3; intermediate, therefore, between their Neolithic predecessors and the present inhabitants of Britain. Many of the tibiæ also possessed a retroverted direction of the head of the bone; but the plane of the condylar articular surfaces was not thereby affected, so that the backward direction of the head exercised no adverse influence on the assumption of the erect attitude.

Whilst in England the Bronze Age round barrows are numerous and the burials in short cists are comparatively rare, in Scotland the opposite prevails. Whilst part of Dr. Thurnam's aphorism, viz. "long barrows, long skulls," applies to both countries, the remaining part, "short barrows, short skulls," should be modified in Scotland to "short cists, short or round skulls."

The presence of dolichocephalic skulls in the interments of the Bronze Age shows that the Neolithic people had commingled with the brachycephalic race. Similarly the Bronze men, though subject to successive invasions by Romans, Angles, and Scandinavians, have persisted as a constituent element of the people of Great Britain. The author has found a strong brachycephalic admixture in the crania of modern Scots, in Fife, the Lothians, Peebles, and as far north as Shetland. In 116 specimens measured, 29, *i.e.* one-quarter, had a length-breadth index 80 and upwards, and in five of these the index was more than 85.

The question has been much discussed whether the people of the Polished Stone Age were descended from the men of the Ruder Stone Age, or were separated from them by a distinct interval of time. The latter view has been supported by Prof. Boyd Dawkins, who contends that there is a great zoological break between the fauna of the Palæolithic, Pleistocene period and that of the Neolithic Age, and that the two periods are separated from each other by a revolution in climate, geography and animal life.[2]

Undoubtedly many large characteristic mammals of the Palæolithic fauna had entirely disappeared from Britain and western Europe, but some nine or ten species, as the otter, wolf, wild cat, wild boar, stag, roe, urus and horse, were continued into the Neolithic period; at which time the dog, small ox, pig, goat, and perhaps the sheep, as is shown by their osseous remains, were also naturalised in Britain. The continuity of our island with the continent by intermediate land, which existed during Palæolithic times, also became severed, and a genial temperate climate replaced more or less arctic conditions.

Man, however, possesses a power of accommodation, and of adapting himself to changes in his environment, such as is not possessed by a mere animal. The locus of an animal is regulated by the climate and the nature of the food, so that a change of climate, which would destroy the special food on which an animal lives, would lead to the extinction of the animal in that locality. Man, on the other hand, is omnivorous, and can sustain himself alike on the flesh of seals, whales and bears in the Arctic circle, and on the fruits which ripen under a tropical sun. Man can produce fire to cook his food and to protect himself from cold, and can also manufacture clothing when necessary. Palæolithic man has left evidence that he had the capability to improve, for the cave men were undoubtedly in advance of the men who made the flint implements found in the river drifts. The capacity of the few crania of Palæolithic man which have been preserved is quite equal to, and in some cases superior to that of modern savages. So far as regards the implements which he manufactured and employed, Neolithic man showed no material advance over the Palæolithic cave dweller.

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[1] *Journal of Anat. and Phys.*, October 1896, vol. xxxi.

[2] "Cave Hunting, and *Journal* of Anthropological Institute," vol. xxiii., February 1894.

The association of the bones of domestic mammals, which were not present in Palæolithic strata, along with the remains of Neolithic man, proves that additional species had been introduced into Western Europe at a particular period, probably by another race which had migrated northward and westward; but it by no means follows that Palæolithic man had of necessity disappeared prior to this migration, and that when Neolithic man reached Western Europe he found it, as regards his own species, a desolate solitude. How then did Neolithic man with his associated animals find his way into Britain?

Was it whilst the land remained, which connected Britain with the continent in interglacial times, and along which Palæolithic man had travelled, or was it at some subsequent period after the formation of intermediate arms of the sea? If the latter, then the further question arises, How was the transit effected? Neolithic man, so far as is known, had no other means of conveyance by water than was afforded by a canoe dug out of the stem of a tree. Although such rude boats might in calm weather serve as the means of transporting a few individuals at one time across a river or narrow strait from one shore to the other, they can scarcely be regarded as fitted for an extensive migration of people; still less as a means of conveying their pigs, dogs, goats and oxen. Hence one is led to the hypothesis that, after the sea had submerged the intermediate land of interglacial times, there had been a subsequent elevation so that Britain again became a part of the continent of Europe. If one may use the expression, a "Neolithic land bridge" was produced, continental relations and climate were for a time re-established, and a free immigration of Neolithic man with his domestic animals became possible. This may have been at the period when an abundant forest growth in Scotland succeeded the elevation of what is now called the 100-foot terrace. There is no evidence of the presence of Neolithic man in Scotland until about that period. Before this island with its surrounding and protecting "silver streak" settled down to the present distribution of land and water, there are ample data, as is shown by the three sea beaches at different levels seen so distinctly on the coast of Scotland, that frequent oscillations changed the relative positions of land and sea to each other.

From the consideration of what may be called the biological data, the conclusion seems not to be justified, that because climatic changes had led to a disappearance of certain characteristic Palæolithic mammals, but by no means of all, therefore Palæolithic man had vanished along with them. When Neolithic man reached Western Europe, he in all likelihood found his Palæolithic predecessor settled there, and a greater or less degree of fusion took place between them. Hence, as the present inhabitants of Britain may claim the men both of the Neolithic and Bronze Ages as their ancestors, it is possible that as Neolithic man migrated northward into Scotland he may have carried with him a strain of Palæolithic blood. W. T.

PROGRESS OF TECHNICAL EDUCATION.

A REVIEW of the progress of technical education in the United Kingdom during the year 1896-97 is given in the tenth annual report of the National Association for the Promotion of Technical and Secondary Education. A general idea of the present position of the technical education movement may be obtained from the subjoined extracts from the report just issued.

Technical Education in England.

It is pleasing to be able to record that, in the year 1896-97, the total amount of money available under the Local Taxation (Customs and Excise) Act, 1890, and distributed to the local authorities, was larger than in any previous year, and that a further advance has been made as regards its utilisation for educational purposes.

Of the 49 County Councils in England 41 are now giving all and eight are giving part of their grants to educational purposes, while of the 61 County Borough Councils 55 are devoting all and six are devoting part of the fund in a like manner. In the county borough of Preston a noteworthy advance has been made. In this locality a new technical institute, erected by the Harris Trustees at a cost of about 20,000*l.*, has recently been opened, and the County Borough Council, by voting a sum of 500*l.* in aid of technical education in the borough, have now retired from that position of isolation which they had hitherto occupied. At the present time, therefore, all the County and County Borough Councils in England are utilising the provisions of the Technical Instruction Acts.

In considering the amount of money devoted one way and another, it may be stated that, of the total of 807,000*l.* now available in England alone, no less a sum than 740,000*l.* is being spent upon education. It is worthy of note that London's share of the fund now reaches 185,000*l.*, of which a sum of 150,000*l.* is being utilised for educational purposes, a growth of 30,000*l.* as compared with last year's vote. Therefore, looking at the position as a whole, it is clear that education continues to receive financial support of an extending character.

In last year's report particulars were given respecting local authorities contributing funds to education in the form of *rate aid*. The information then published went to show that there were at least 137 localities providing a total sum of 34,000*l.* in this manner. To these figures must now be added a further 23 authorities raising 5000*l.*, thus making an aggregate number of 160 local authorities levying rates, or voting lump sums from the rate-fund, to the extent of 39,000*l.*

The extent to which local authorities and responsible committees in England have built, or are building, or are about to build, technical schools is shown by the fact that the number of such schools thus initiated now reaches 161, of which 146 involve a capital expenditure of 1,730,000*l.* This sum is *exclusive* of about 500,000*l.* absorbed by the establishment of polytechnic institutions in London. It is worthy of notice that in Burslem, Chesterfield, Dewsbury, Keighley, Plymouth, Rochdale, Southport and Walsall the necessary funds for building purposes were provided entirely by voluntary contributions, and that in Lancaster, Northwich, St. Helens, Sandbach and Winsford sites and technical schools have been presented to the local authorities by private individuals; it may be estimated that, with the exception of Lancaster and Sandbach, concerning which complete information is not available, the financial provision which has thus been made in eleven localities represents a total of 137,000*l.* Of the aggregate number of technical schools mentioned above, 100 are already at work, 26 new schools, situate in 13 different counties, having been opened during the past year; the localities in which the largest of these new schools are to be found and the amounts spent upon the buildings are—Leicester (40,000*l.*), Preston (20,000*l.*), Darlington (16,000*l.*), Oldham and West Hartlepool (15,000*l.* each), Darwen (14,000*l.*), Swindon (13,000*l.*), and Handsworth and Northwich (10,000*l.* each). There remain, therefore, 61 technical schools which, according to the latest information, are still incomplete; but it must be understood that this number includes localities where technical schools have been transferred to the local authorities and where new schools are also being built.

In Bradford the technical college, upon which has been spent no less than 155,000*l.* (50,000*l.* for buildings and 105,000*l.* for maintenance), mainly provided by private munificence, now receives an annual grant of 2875*l.* from the Corporation; in Huddersfield, the Governing Body of the technical college have recently decided to proceed with considerable extensions to the present buildings at an expenditure, including the cost of furnishing, of 12,000*l.*; in Keighley, the mechanics' institution was founded in 1825, a new building, costing nearly 20,000*l.*, was erected by public subscription in 1870, and an additional wing was built, at an outlay of 11,000*l.*, in 1887. Hitherto there has been but one instance of a local authority divesting themselves of their powers of direct control, namely that of Burnley, where the County Borough Council, having established a technical school at a cost of 4000*l.*, transferred the management of the same to the Committee of the local mechanics' institution, the Committee receiving an annual grant of 1000*l.* from the Council.

During the year ended March 31, 1896, the expenditure, excluding capital outlay, upon agricultural education by thirty-six County Councils in England reached a total sum of 58,349*l.*

According to the latest annual report of the Board of Agriculture, the amount of money applied to this branch of technical education by the County Councils of England (including Monmouthshire, but excluding Derbyshire, the Soke of Peterborough and the Southern Division of Buckinghamshire) during the year 1896-97 was estimated to be 78,000*l.*, which sum includes capital expenditure.